UNITED
NATIONS

A

General Assembly

Distr.
GENERAL

A/AC.218/1992/6
7 January 1992

ORIGINAL: ENGLISH

COMMITTEE ON THE DEVELOPMENT AND UTILIZATION
OF NEW AND RENEWABLE SOURCES OF ENERGY
Sixth session
3-14 February 1992
Item 3 of the provisional agenda*

IMPLEMENTATION OF THE NAIROBI PROGRAMME OF ACTION FOR THE DEVELOPMENT AND UTILIZATION OF NEW AND RENEWABLE SOURCES OF ENERGY

Activities being carried out by the entities within the United Nations system in the field of new and renewable sources of energy

Report of the Secretary-General

SUMMARY

This report presents an overview of the activities being carried out by the entities of the United Nations system in the field of new and renewable sources of energy. An analysis of the involvement of those entities reveals clusters of organizations in certain of the priority areas outlined in the Nairobi Programme of Action. A similar cluster pattern is also revealed with respect to the various sources of energy.

The United Nations system has undertaken wide-ranging activities for assisting the developing countries to incorporate new and renewable sources of energy into their national energy mix. Substantial progress has been made in many developing countries. Progress has also been achieved in understanding the technical feasibility of the new and renewable energy technologies.

* A/AC.218/1992/1.

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INTRODUCTION

1. At its fifth session, from 26 March to 4 April 1990, the Committee on the Development and Utilization of New and Renewable Sources of Energy concluded that the implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy required sustained and continuous efforts by the United Nations system, through the preparation and execution of concrete programmes and projects, in accordance with national plans and priorities. In view of the Committee's responsibility of monitoring the implementation of the Nairobi Programme of Action, the Committee requested the Secretary-General to submit a report on the activities being carried out by the entities within the system in the field of new and renewable sources of energy, for consideration at its sixth session. 1/ This report has been prepared in response to that request. It presents an overview of the activities and an analysis of trends.

2. The report is based on information provided by the entities within the United Nations system. The information made available varied in the extent of its coverage from very brief to very detailed. It did not, however, cover the extent of implementation of the programmes, plans for future activities or activities in the pipeline. It was supplemented, where necessary, with information in the database maintained by the New and Renewable Sources of Energy Section, Energy and Resources Branch, Department of International Economic and Social Affairs.

I. PROJECTS AND PROGRAMMES

3. The Nairobi Programme of Action called for the development and utilization of new and renewable sources of energy, especially in the developing countries, and identified broad policy areas for concerted action: energy assessment and planning; research, development and demonstration; transfer, adaptation and application of mature technologies; information flows; education and training; and rural energy development. Within the policy areas, the following sources of new and renewable sources of energy were emphasized for development: solar, wind, biomass, fuelwood and charcoal, hydro, geothermal, draught animal power, ocean energy, tar sands and oil shale, peat. 2/

4. Table 1 shows the activities undertaken with respect to the above-mentioned policy areas by the entities within the United Nations system in the implementation of the Programme of Action. While the activities were of various types, they have been broadly classified under the categories of supporting measures and technology/resource transfers. Supporting measures include, in addition to an assessment of new and renewable sources of energy resources, such activities as information exchange, reports and publications, workshops, seminars, symposia etc. Technology transfer is effected under technical cooperation projects, and resource transfers are in the form of financial assistance and grants at the pre-investment and investment levels.

Table 1. Activities of the United Nations system in the implementation of the Nairobi Programme of Action

Nature of activities and entities of the United Nations involved / Priorities of the Nairobi Programme of Action	Supporting measures		Technology/resource transfer	
	Information exchange, studies, publications, reports to intergovernmental meetings	Meetings, symposiums, experts groups, seminars, workshops	Technical cooperation projects/ activities	Financial assistance/ grants
Energy assessment planning	DIESA, DTCD, ECA, ECE, ECLAC, ESCAP, ESCWA, FAO, IBRD, UNESCO, UNEP, UNIDO, UNITAR, UNU, WMO	DIESA, DTCD, ECA, ECE, ESCAP, ESCWA, FAO, INSTRAW, UNDP, UNESCO, UNIDO, UNITAR, UNU, WMO	DTCD, ECE, ESCAP, ESCWA, FAO, ILO, UNIDO, UNDP	UNDP, IBRD, IDA
Research, development and demonstration	DTCD, ECA, ECE, ECLAC, ESCAP, ESCWA, FAO, UNIDO, UNU	DTCD, ECA, ECE, ESCAP, ESCWA, FAO, UNIDO, UNU	DTCD, ECE, ESCAP, ESCWA, FAO, UNICEF, WHO	UNDP
Transfer, adaptation and application of mature technologies	DTCD, ECA, ECE, ECLAC, ESCWA, FAO, UNIDO, UNU, UNICEF, WHO	DTCD, ECE, ECA, ECLAC, ESCAP, ESCWA, FAO, UNIDO, UNU, UNICEF, WHO	DTCD, ECE, ESCAP, ESCWA, FAO, UNIDO, UNU, UNICEF, WHO	UNDP, IBRD, IDA
Information flows	DIESA, DTCD, ECE, ESCAP, FAO, UNESCO, UNU	DTCD, ECE, ESCAP, FAO, UNESCO, UNU	DTCD, ECE, ESCAP, FAO, UNESCO	UNDP
Education and training	DIESA, DTCD, ECA, ECE, ESCAP, ESCWA, FAO, UNESCO, UNIDO, UNU	DTCD, ECE, ESCAP, ESCWA, FAO, UNESCO, UNIDO, UNU	DTCD, ECE, ESCAP, FAO, UNESCO	UNDP
Rural energy development	DTCD, ECA, ESCAP, ESCWA, FAO, UNU	DTCD, ECA, ESCAP, FAO	DTCD, ESCAP, FAO	UNDP, IFAD

Source: Reports from the entities of the United Nations system.

Note: For a list of abbreviations, see annex.

5. As table 1 shows, the involvement of the entities of the United Nations system occurs in clusters, with a higher concentration in the category of supporting measures. This is largely due to mandates, the nature of their activities and the financial and human resource constraints of the organizations involved.

6. Within the supporting measures category, further clustering is observed. For instance, relatively more activities have been carried out in energy assessment and planning and in education and training; this may reflect the availability of resources within the organizations, which essentially influences the nature of activities that can be carried out.

7. Few organizations are involved in the technology/resource transfer category, in large part owing to the type and amount of resources required. Organizations active under this category are mainly agencies with financial resources for development assistance. Other organizations have been able to contribute through extrabudgetary arrangements.

A. Activities in the implementation of the Nairobi Programme of Action

8. In implementation of the Nairobi Programme of Action, the entities within the United Nations system have undertaken a wide range of activities. Substantial progress has been achieved in providing assistance to the developing countries in the assessment of new and renewable sources of energy resources and in the evaluation of the technical feasibility of associated technologies. Although a large number of the activities are of a supporting nature, substantial contributions continue to be provided by a number of organizations in the transfer of technology, through technical cooperation projects and activities.

9. The Department of International Economic and Social Affairs continues to monitor progress made in the implementation of the Programme of Action and provides substantive support to the Committee on the Development and Utilization of New and Renewable Sources of Energy. It also provides support to the Administrative Committee on Coordination (ACC) Inter-agency Group on New and Renewable Sources of Energy, charged with the task of coordinating relevant activities within the United Nations system. The Department analyses global trends and prospects of new and renewable sources of energy and prepares integrated reports on the activities and programmes of United Nations bodies, other intergovernmental and non-governmental and public and private-sector national organizations. It also prepares technical reports on various types of new and renewable sources of energy and collects, processes and disseminates, world wide, through the network of focal points (national and within the United Nations system) information on activities in the field of new and renewable sources of energy. It maintains a database and regularly produces a compendium of such activities.

10. The Department of Technical Cooperation for Development provides the services of interregional and technical advisers to developing countries requesting them. Advisory services continue to be provided on exploration and development of geothermal reserves, hydropower, solar, wind and biomass energy. Such services are also continuing on energy planning and information systems, development of national energy policy and conservation programmes, strengthening of energy-related institutions and legislation, promotion of modern energy technologies, and rehabilitation and upgrading of electric power networks. The Department also organizes broad-spectrum training courses, seminars and workshops for managers, engineers and technicians.

11. The Economic and Social Commission for Asia and the Pacific (ESCAP), in addition to regular budget activities, implements new and renewable sources of energy activities funded by the United Nations Development Programmme (UNDP), such as the Regional Energy Development Programme for the Asian subregion, the Pacific Energy Development Programme, and a regional network on biomass, solar and wind energy. Technical assistance projects in new and renewable sources of energy, including rural energy planning, have been implemented through information support, consultancy services, training programmes, workshops, seminars and expert group meetings. In the implementation of these projects, technical cooperation among developing countries has been emphasized.

12. New and renewable sources of energy applications have been ranked in terms of priority for development and use by the member countries of ESCAP. The priority rankings and the respective priority levels are shown in table 2. A regional priority project package has been developed through consultation with the countries of the region. However, several of the projects in the package - resource assessments, biomass conversion for rural energy supplies and solar thermal systems - have not been implemented due to lack of financing. Rural energy planning studies have been conducted in a number of countries in the region. Assistance is being provided for demonstration and training facilities in solar photovoltaic technology, and network arrangements are being pursued with other organizations in this field.

13. The Economic Commission for Africa (ECA) prepares reports and analyses on the development of new and renewable sources of energy in the regional countries and provides advisory services. More consideration has in recent years been given to the utilization of solar energy, wind power, biomass conversion, ocean energy and the efficient use of energy in rural and remote areas.

14. The Economic Commission for Europe (ECE) has been very active in the development and utilization of new and renewable sources of energy in its member countries. Several of its activities have progressed beyond the development stage to the application and adaptation of mature technologies. The high level of activity is being maintained with numerous new projects.

Table 2. Priority rankings of new and renewable sources of energy applications by the countries of the ESCAP region

Priority ranking	Applications	Total of rankings by individual countries			Priority level
		High	Medium	Low	
1	Solar photovoltaic technology	16	1	-	H
2	New and renewable sources of energy planning and management	14	3	-	H
3	Rural energy planning and management	14	2	1	H
4	Forestry for fuel	10	4	3	H
5	Solar thermal energy for heating	9	6	2	H
6	Small hydro power	9	2	6	H
7	Wind water pumping systems	8	7	2	H
8	Solar crop drying and cooling	8	6	3	H
9	Biogas plants for small-holders	8	4	5	H
10	Agricultural residues, utilization of	7	7	3	H
10	Solar refrigeration	7	7	3	H
11	Efficient cooking stoves	6	9	2	H
12	Wind electricity systems	5	7	5	M
13	Biomass gasifier technology	5	6	6	M
14	Biogas plants based on industrial effluents	5	4	7	M
15	Solar cookers	4	9	4	M
16	Solar air-conditioning	4	8	5	M
17	Biogas plants for institutional and community use	4	7	6	M
18	Briquetting, densification and carbonization	4	6	7	M
19	Biomass thermal power plant	4	4	9	L
20	Fuel alcohol	3	9	5	L
20	Solar thermal electrical systems	3	9	5	L
21	Geothermal energy	3	3	11	L
22	Peat	1	2	14	L

Table 2 (continued)

Priority ranking	Applications	Total of rankings by individual countries			Priority level
		High	Medium	Low	
23	Tidal power	-	8	9	L
24	Vegetable oil as fuels	-	7	10	L
25	Wave energy	-	5	12	L
26	Ocean thermal power	-	4	13	L

Source: Third meeting of ESCAP focal points on new and renewable sources of energy, September 1988, Bangkok.

15. The Economic and Social Commission for Western Asia (ESCWA) has conducted studies to identify specific areas for application of new and renewable sources of energy in the region, including the establishment of solar and wind energy measuring networks, solar and wind pumping in remote areas, and solar and wind energy for desalination of brackish and sea water.

16. Reports and studies on new and renewable sources of energy by the Economic Commission for Latin America and the Caribbean (ECLAC) have included evaluations of the possibility of substituting local sources of energy, such as geothermal, hydroelectricity and firewood, for imported petroleum products.

17. In providing assistance to its member countries in the implementation of the Nairobi Programme of Action, while taking the lead in identifying needs and problems and promoting appropriate action related to energy for rural development, the programmes of the Food and Agriculture Organization of the United Nations (FAO) have emphasized the development and promotion of new and renewable sources of energy adapted to the socio-economic needs of rural populations in the developing countries. FAO programmes also include a networking of national institutions, particularly through technical cooperation among developing countries. Its activities in the area of energy assessment and planning focus on developing an integrated approach by incorporating energy into rural and agricultural planning and on assistance to countries in establishing a framework for activities in this field. FAO also promotes the use of mature and promising technologies and carries out programmes and projects at various levels - global, interregional, regional and country - concentrating on priority areas identified by its governing body - for example, energy assessment and planning for rural and agricultural development, fuelwood and charcoal, biomass, draught animal power, solar energy, wind energy and people's participation in energy programmes for rural areas, with special reference to women.

18. In conformity with its mandate for information dissemination and its experience in the field, the energy programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO) is designed to stimulate research in and evaluation of global energy programmes and to develop training and information programmes to sensitize both specialists and the general public to the possible utilization of new and renewable sources of energy and energy conservation. UNESCO activities in the field of energy focus on the development of training and information services in new and renewable sources of energy, energy conservation and global aspects of energy policy, especially with regard to environmental considerations, and the establishment of an international forum to review and evaluate the impacts of energy use. One of the main achievements of the information programme was the establishment of an energy knowledge bank on new and renewable sources of energy and energy conservation. A networking programme, launched by UNESCO, led to the establishment of several regional networks on renewable energy information (Africa, Caribbean, Latin America, and Asia and the Pacific), which are being continually developed and consolidated. UNESCO's training scheme involves several types of programmes: the Energy Training Programme, the Summer School on Solar Electricity for Rural and Remote Areas, and the Study Grant Programme. UNESCO also publishes the International Journal of Global Energy Issues.

19. One of the main activities of the United Nations Institute for Training and Research (UNITAR) in the field of new and renewable sources of energy has been the UNITAR/UNDP Centre on Small Energy Resources, located in Rome. The Centre publishes a newsletter four times a year and has conducted a number of workshops, including the first international conference on small geothermal resources, and an expert meeting on energy for rural Africa. After the workshops and seminars, the Centre published technical guidelines - for example, on geothermal energy development and on drilling and the testing of geothermal fluids. A guidebook for policy planners, "Photovoltaic resources: application, utilization and assessment", was published. UNITAR also organizes the triennial International Conference on Heavy Crude and Tar Sands; the fifth conference was held in Caracas in August 1991.

20. The activities of the United Nations Industrial Development Organization (UNIDO) in new and renewable sources of energy are directed towards energy-related aspects of industrialization, such as energy conservation and energy management. Support is provided in the areas of transfer and application of technology, strengthening of institutional infrastructures for the development of new and renewable sources of energy, identification of financial resources, training of technical and managerial personnel, and establishment of appropriate legislative and regulatory frameworks. Requests from developing countries for UNIDO's technical assistance in the field of new and renewable sources of energy are mainly in biomass, hydropower, solar and wind-related energy systems.

21. The World Meteorological Organization (WMO), while providing overall coordination for the World Climate Programme, has been carrying out activities on climate application to the energy sector, including compatible

climatological databases for use in energy planning and operations, as exemplified by the regional project "Meteorological information for the development of renewable energy", financed by UNDP. Solar and wind energy continue to be given priority. With UNDP assistance, WMO is helping eastern and southern European countries in a two-year pilot project on the use of their climatological information for the assessment of wind and solar energy potential. Since the adoption of the Nairobi Programme of Action, WMO has conducted eight workshops of one-week duration on the presentation and use of meteorological information for solar and wind energy resource assessment, and many advisory missions.

22. The activities of the United Nations Centre for Human Settlements (UNCHS) have included several publications on the use of new and renewable sources of energy, with emphasis on shelter requirements, construction, and the production of building materials. UNCHS is also carrying out a pre-feasibility study for a pilot project on district cooling systems based on the use of the waste energy from electric power stations.

23. The World Bank considers new and renewable sources of energy as another supply option which must be evaluated, together with other energy alternatives, on the basis of the same investment criteria. Although the Bank continues to support efforts to develop new and renewable sources of energy, its overall involvement, except in the case of fuelwood, has been reduced. This is because the Bank feels that technologies are often not mature enough to meet its project lending criteria, based on a performance track record of economic and financial viability. Even when a technology is regarded as mature, it is often difficult to design a project of enough critical mass to have an acceptable ratio of staff time to investment cost, and hence to merit consideration as a stand-alone lending activity. Moreover, the Bank considers the institutional and policy framework for the implementation of new and renewable sources of energy projects to be generally weak in many developing countries. In many cases there has been a clear need for intensive pre-investment work rather than investment financing. At present, most of the activities in this field are carried out under the joint World Bank/UNDP Bilateral Aid Energy Sector Management Assistance Programme (ESMAP). New and renewable sources of energy are only one component in ESMAP's broader mandate to assist the developing countries address urgent issues related to overall energy efficiency and overdependence on traditional fuels. However, large hydroelectric projects comprise a major area of lending, and the Bank has provided financing for a number of small hydro projects, including financing by the International Finance Corporation (IFC) for private-sector manufacturing of hydro equipment. Although the Bank's lending for fuelwood/forestry projects is continuing, lending for other biomass technologies and for solar and wind energy has mainly taken the form of the financing of pilot and demonstration activities, included as small components of large energy or agriculture projects.

24. Solar photovoltaic (PV) stand-alone systems (and installation) have been increasingly requested by UNICEF-supported projects in remote rural areas or in areas where other sources of energy are unreliable. Vaccine refrigerators

and, to a lesser degree, water pumps and lighting systems have been the main systems provided. The involvement of UNICEF with these small stand-alone systems extends beyond merely supplying the systems. In cooperation with other agencies - mainly, the World Health Organization (WHO), Governments, non-governmental organizations, manufacturers and specialized consulting firms - UNICEF's experience has extended to all aspects of such projects, such as comparative efficiency with other low-cost energy options, economic viability, design improvement, product testing, performance monitoring and evaluation, and cost analysis. UNICEF country offices have also been involved in activities related to new and renewable sources of energy, such as fuelwood and charcoal and draught animal power, although more modest in size.

25. The World Health Organization (WHO) is promoting multidisciplinary research on the epidemiological aspects of biomass fuel, in recognition of the major health hazards associated with its use, especially for women and children, who are responsible in most societies for the provision of fuel and the cooking of food. WHO is also studying appropriate technical interventions (including alternate energies) and on the social dimensions of the problem.

26. The United Nations University (UNU) continues to develop new approaches to the diffusion of promising renewable energy technologies to rural areas and new ways of integrating energy systems rationally into the fabric of local communities and disseminating information on solar, wind and bioconversion energy technologies, integrated rural energy systems, and the social, cultural, economic, health and environmental aspects of their use.

27. The United Nations Development Programme (UNDP) continues to provide assistance to the developing countries in the field of new and renewable sources of energy through technical cooperation, while ensuring the priorities established by recipient countries. UNDP also continues to be a major source of funding for projects carried out by several entities of the United Nations system and for the regional development programmes.

28. The United Nations Revolving Fund for Natural Resources Exploration remains firmly committed to the promotion and development of geothermal resources in the developing countries.

B. Activities in specific new and renewable sources of energy

29. The activities carried out by the entities of the United Nations system with respect to specific new and renewable sources of energy are shown in table 3. They range from mature and commercially proven technologies such as hydropower and wood-fired steam generation plants to technologies which are still in the early stages of commercial use and research and development, such as photovoltaics or alcohol derived from cellulosic biomass.

30. Table 3 shows clusters of activities by the entities of the United Nations system in technologies such as solar, wind, biomass, fuelwood and charcoal, which are suitable for utilization in a decentralized form in developing countries.

Table 3. Activities of the United Nations system in specific new and renewable sources of energy

Nature of activities and entities of the United Nations involved / Priorities of the Nairobi Programme of Action	Supporting measures: Information exchange, studies, publications, reports to intergovernmental meetings	Supporting measures: Meetings, symposiums, expert groups, seminars, workshops	Technology/resource transfer: Technical cooperation projects/ activities	Technology/resource transfer: Financial assistance/ grants
Solar energy	DIESA, DTCD, ECA, ECE, ECLAC, ESCWA, FAO, UNCHS, UNESCO, UNIDO, UNU	DIESA, DTCD, ECA, ECE, ESCAP, FAO, UNIDO	DTCD, ECE, ESCAP, FAO UNIDO	UNDP, IBRD
Wind	DIESA, DTCD, ECA, ECE, ECLAC, ESCAP, ESCWA, FAO, UNIDO	DTCD, ECA, ECE, ESCAP, FAO, UNIDO	DTCD, ECE, ESCAP, FAO, UNIDO	UNDP, IBRD
Biomass	DIESA, ECA, ECLAC, ESCAP, ESCWA, FAO, UNEP, UNIDO, UNU	ECA, ECE, ESCAP, ESCWA, FAO, UNIDO,	DTCD, ECE, ESCWA, FAO, UNIDO	UNDP, IBRD
Fuelwood and charcoal	DIESA, ECE, ECLAC, ESCAP, ESCWA, FAO, UNEP, UNIDO	ECA, ESCAP, ESCWA, FAO	ESCAP, FAO	UNDP, IBRD
Hydro	DIESA, DTCD, ESCAP	DTCD	DTCD, UNIDO	UNDP, IRRD
Geothermal	DIESA, DTCD, ECA, ECLAC, ESCAP, ESCWA	DTCD	DTCD, UNRFNRE	UNDP, IBRD
Draught animal power	DIESA, ESCAP, FAO	ESCAP, FAO	ESCAP, FAO	UNDP, IRRD
Ocean energy	DIESA, DTCD, ESCAP, ECE, UNDP	DTCD, ESCAP, ECE		
Tar sands and oil shale	DIESA, DTCD, ESCAP, UNDP, UNITAR	DTCD, UNITAR, UNDP		
Peat	DIESA, DTCD			

Source: Reports from the entities of the United Nations system.

31. Activities in solar energy range from active solar energy systems, such as solar drying and cooling of grain in bulk storage, to passive solar energy systems for rural energy supply and urban industry.

32. A significant number of the activities of the United Nations system in wind energy technology in the developing countries are directed towards wind pumps, which have also featured in development aid projects in a number of developing countries.

33. The United Nations system has emphasized the assessment of biomass as an energy resource. Activities include information networks in some countries and regions, with linkages to networks in the industrial countries where information sources and dissemination facilities are considerable.

34. Activities in fuelwood include surveys of its utilization, the dissemination of energy-efficient wood stoves, and expanded efforts for reforestation and tree-planting.

35. A large number of the United Nations programmes in hydropower involves small-scale plants. The activities are mostly directed towards technical training and feasibility studies, including socio-economic impacts. The objective, in general, is for the developing countries to achieve greater self-reliance in the development of their hydropower resources.

36. The United Nations system has played a pioneering role in promoting geothermal energy development in the developing countries and is actively continuing its efforts. However, a large geothermal potential remains untapped, despite favourable geological conditions in a number of developing countries.

37. In ocean energy, there is currently little activity at the country level that goes beyond prototype-testing and feasibility studies for large-scale demonstration. Activities of the United Nations system in this field have been limited to promoting awareness of the different technologies under study, for possible application, especially in small island countries.

38. With regard to draught animal power, activities consist of conferences, meetings and workshops in Africa and Asia and the Pacific for the purpose of exchanging information and experiences.

39. Very limited activities are reported for oil shale, tar sands and peat.

II. ASSESSMENT OF PROGRESS ACHIEVED

40. The entities of the United Nations system continue their efforts to implement the Nairobi Programme of Action, and the activities outlined above represent those efforts. A summary list of the projects and programmes undertaken by the organizations since 1989, and continuing, is presented in table 4.

Table 4. List of projects in new and renewable sources of energy being executed by the entities of the United Nations system since 1989 and continuing

Executing agency	Country	Project title
DTCD	Costa Rica	Energy planning
	China	Solar heating and cooking
	Vietnam	Restoration of power generation capacity
	Pakistan	Demonstration of renewable technologies for rural areas
	Bangladesh	Strengthening the energy study and planning cell in the Planning Commission
	Nepal	Engineering education (hydro)
	China	Exploration, development and utilization of geothermal resources in China
	Kenya	Exploration of geothermal energy, phase II
	Egypt	Development and demonstration of prototypes for renewable sources of energy in selected areas
	Egypt	Electricity/energy databank
	Bolivia	Geothermal feasibility study in the area of Laguna Colorado
	Bangladesh	Strengthening manpower development and training in the Bangladesh Power Development Board
	China	Geothermal district heating in Beijing and Tianjin areas
	Ghana	Technical assistance to National Energy Board
	Honduras	Pre-feasibility study of geothermal resources in the central region
	Regional	Assistance to OLADE "Apoyo al Programa Latinamericano de cooperacion energetica"

Table 4 (continued)

Executing agency	Country	Project title
	Korea, Rep. of	Training for study of energy policy
	India	Solar energy centre
	Afghanistan	Solar energy and other renewable energy development
	Philippines	Management of geothermal resources
	Peru	Polysilicon laboratory
	Philippines	Development of geothermal energy for power and non-electrical uses
	Iraq	Solar energy resources assessment and development
	Ethiopia	Small-scale hydropower development
	Cuba	Silicon laboratory
	Bangladesh	Power system loss-reduction programme
	India	Energy conservation programme
	Peru	Assistance to CENERGIA
	Regional	Assistance to the programme of Latin America and the Caribbean for cooperation in energy - OLADE
	China	Development of photovoltaic systems in western China
	Mongolia	Feasibility studies for development of solar photovoltaic cells
	Mongolia	Applied research and development for rural use of renewable energy
	China	Exploration, development and utilization of geothermal resources in China (phase II in Tibet)
ECE	Regional	Energy-efficient building systems
	Regional	Utilization of low-calorie fuels

Table 4 (continued)

Executing agency	Country	Project title
ESCAP	Regional	Regional energy development programme, phase III
	Regional	Pacific energy development programme, phase II
ESCWA	Regional	Regional consultative meeting for promoting the development of new and renewable sources of energy in the ESCWA region
	Regional	Biogas technology for rural areas in selected Arab countries
FAO	Regional	Development of integrated farm energy systems, II (Europe)
	China	Establishment of integrated energy base for the cold northeastern region of China
	Regional	Rural energy assessment and planning in Asia and the Pacific
	Regional	Regional energy development programme: component on rural energy planning (in association with ESCAP)
FAO	Burkina Faso	Ouagadougou forest development
	Chad	Forest management
	Nepal	Technical assistance to Terai forestry project
	Niger	Research, selection and adaptation of draught animal power equipment
	Burkina Faso	Forest management of national forests
	Malawi	Animal power utilization
	Burkina Faso	Programme for nursery training and tree management for product of fuelwood
	Benin	Mechinisme agricole, Centre national de formation à la culture atelée
	Ghana	Rural energy planning
	Ghana	Energy use in agriculture in Ghana

Table 4 (continued)

Executing agency	Country	Project title
	Ghana	Assessment and use of bio-energy residues and wastes in Ghana
IBRD (as principal agency or in associative arrangements)	Kenya	Kiambere/Cambery hydroelectric power station
	Indonesia	Cirata hydropower project in West Java
	Papua New Guinea	Hydroelectric power project
	Rwanda	Rehabilitation of the power network
	Zaire	SNELL investment programme
	Thailand	Hydropower projects: Cheo Larn
	Guatemala	Power distribution project
	Brazil	Power sector rehabilitation plan
	Guadelope	Biomass gasifier monitoring programme
	Nepal	Pacheshwor and Rapti Indo-Nepalese hydropower projects
	Egypt	Esna barrage power station
	Lesotho	Highlands water project
	Argentina	Alicura II power plant on the Limay river
	Mauritius	National energy programme
	Chile	Pehuenche hydropower station
	Indonesia	Energy conservation centre
	Brazil	Hydroelectric project, Aracuai river
	Thailand	Accelerated dissemination of improved stoves
	Jordan	Wind energy project in Jordan
	Ghana	Improved charcoal production

Table 4 (continued)

Executing agency	Country	Project title
	Ghana	Improved charcoal stove programme targeted at urban households
	Sri Lanka	Mahaweli Ganga fuelwood development programme
	Regional	Energy planning systems (joint Euro-Arab project)
	Malawi	Energy sector planning and management
	Global	ESMAP Phase II: Energy strategy and efficiency/household energy and renewables
	India	Upper Indravati hydro project, Orissa
	Jordan	Power subsector development
	India	Improved hydropower capacity
IDA	Bhutan	Tree nursery development project
	Ethiopia	Fuelwood energy development project
	Ghana	Solar and wind resources assessment
	Lesotho	Sengu River water transport and hydropower station
	Somalia	Animal disease control programme
	Uganda	Forest resources management
UNDP (national pro-grammes)	El Salvador	Photovoltaic modular medical facility for remote areas
	Global	Geothermal Institute of the University of Auckland, New Zealand
	Solomon Islands	National energy sector support and development
	Niger	Pilot project of agro-forestry development in the Department of Dosso
	Haiti	Reforestation in semi-arid zones for fuelwood

Table 4 (continued)

Executing agency	Country	Project title
	Somalia	Forestry development and strengthening of forestry department, II
	Tunisia	Rural appropriate technology centre, II
	Ethiopia	Forestry conservation, II
	Nepal	Appropriate technology and agricultural development
	Philippines	Social forestry
	Benin	Construction of biogas units
	Tunisia	Development of photovoltaic generators, II
	Togo	Hydropower planning
	Tunisia	Biomass study in the rural sector
	Pakistan	Biogas development
UNESCO	Regional	Arab regional information system network (ARIS-NET)
UNIDO	China	Asia-Pacific regional network for small hydropower
	India	Application of alternative fuels for internal combustion engines, II
	Egypt	Conservation in industry
	Madagascar	Research programme
	Paraguay	Development of energy technologies for biomass
	Egypt	Manufacture of wind turbines for electricity production
	Uruguay	Assessment of wind energy
	Uruguay	Biogas production
	Uruguay	Charcoal production and wood gasification
	Uruguay	Potential use of fuelwood/charcoal as fuel in industry

Table 4 (continued)

Executing agency	Country	Project title
	Viet Nam	Development of small hydroelectric plants
	India	Development of amorphous silicon solar cells
	Zimbabwe	Energy auditing training courses
	Gambia	Salt production and marketing in Darsilami village
	Regional	Establishment of energy conservation network - Western Asia
	Regional	Establishment of energy conservation network - Africa
	India	Development and establishment of solar-photovoltaic-powered submersible water pumping systems
UNRFNRE	Mexico	Geothermal exploration project at Planillas, Guadalajara
UNU	Global	Abstracts of selected solar energy technology (ASSET)
	Global	Network of new and renewable energy research institutes
WMO	Regional	Meteorological information for development of renewable energy (Europe)

Source: Department of International Social and Economic Affairs, New and Renewable Sources of Energy Database, 1991.

41. Significant progress has been made in several of the developing countries, where the United Nations system, in a supportive role, has undertaken wide-ranging activities in order to assist the countries in their own efforts. The thrust of the United Nations programmes is directed towards strengthening national institutions, conducting surveys and enhancing national technical capabilities through education and training in the appropriate technologies.

42. Support provided by the United Nations system in national energy assessment and planning has been successful in assisting many countries in determining critical areas of policy and planning.

43. The promotion of human resources development by the United Nations system is carried out mainly by incorporating training and educational activities in the programmes and projects executed by the system. Such activities have also included fellowships, study tours, training workshops and participation in international conferences. Significant progress has been made in promoting education and training through regional training workshops and network activities. An increased awareness of environmental issues in relation to development is reflected in the educational and training activities that are being carried out.

44. In the area of transfer of technology, adaptation and application of mature technologies, owing to the inherent limitations of the processes involved, very few activities are being carried out. The entities of the system have promoted technology transfer by organizing exhibitions and seminars and assisting in the preparation of joint venture proposals. There is a significant lack of support for activities which contribute to technology transfer and which involve the adaptation and application of mature technologies. However, in those developing countries with an established local research and development base and with national and private-sector promotional measures, technology has been transferred, having absorbed modern renewable energy technologies and adapted them to local conditions.

45. In the area of information flows, the activities of certain United Nations agencies have led to the linkage of existing information systems, services and sources of the system. Databases have been interconnected, the involvement of non-governmental organizations has been enhanced, and uniform formats for information compilation, which have led to improved access to information generated in both developing and industrialized countries, have been designed. The United Nations entities concerned continue to provide assistance in various activities related to information-gathering, including document acquisition. Nevertheless, information flows need to be further developed and expanded in the areas identified in the Nairobi Programme of Action.

46. In the area of rural energy supplies, significant progress has been achieved through integrated rural energy development programmes. Many activities have been undertaken on various aspects of rural energy. They focus attention on the need for integrated planning, emphasizing the role of new and renewable sources of energy in a wide range of applications - agricultural production, post-harvest needs, domestic needs, water-lifting etc. - using draught animal power, wood, solar and wind energy, biogas, and efficient cooking stoves, among others. Planning studies and pilot integrated rural energy projects have been undertaken in a number of developing countries.

III. CONCLUSIONS

47. Considerable progress has been achieved by the entities within the United Nations system, despite the limited resources available, in the implementation of the Nairobi Programme of Action. They have undertaken and continue to undertake numerous activities in the promotion of the development and use of new and renewable energy technologies in the developing countries. Any expansion of activities will depend largely on the availability of resources, which continue to be limited and which may in fact have declined in real terms.

Notes

1/ Official Records of the General Assembly, Forty-fifth session, Supplement No. 36 (A/45/36).

2/ Report of the United Nations Conference on New and Renewable Sources of Energy, Nairobi, 10-21 August 1981, (United Nations publication, Sales No. E.81.I.24).

Annex

LIST OF ABBREVIATIONS

DIESA	Department of International Economic and Social Affairs, United Nations Secretariat
DTCD	Department of Technical Cooperation for Development, United Nations Secretariat
ECA	Economic Commission for Africa
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
UNICEF	United Nations Childrens Fund
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
UNRFNRE	United Nations Revolving Fund for Natural Resources Exploration
UNU	United Nations University
UNCHS	United Nations Centre for Human Settlements
INSTRAW	International Research and Training Institute for the Advancement of Women
FAO	Food and Agriculture Organization of the United Nations
WHO	World Health Organization
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association (World Bank)
WMO	World Meteorological Organization
IFAD	International Fund for Agricultural Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization

UNITED
NATIONS

A

General Assembly

Distr.
GENERAL

A/AC.218/1992/7
7 January 1992

ORIGINAL: ENGLISH

COMMITTEE ON THE DEVELOPMENT AND
UTILIZATION OF NEW AND RENEWABLE
SOURCES OF ENERGY
Sixth session
3-14 February 1992
Item 4 (a) and (b) of the
provisional agenda*

PROMOTION OF THE MOBILIZATION OF FINANCIAL RESOURCES REQUIRED IN THE IMPLEMENTATION OF THE NAIROBI PROGRAMME OF ACTION: EXISTING CHANNELS FOR FUNDING NEW AND RENEWABLE SOURCES OF ENERGY, AND PROGRESS ACHIEVED IN MOBILIZING FINANCIAL RESOURCES THROUGH CONSULTATIVE MEETINGS

Mobilization of financial resources and inter-agency coordination

Report of the Secretary-General

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* A/AC.218/1992/1.

INTRODUCTION

1. At its fifth session the Committee on the Development and Utilization of New and Renewable Sources of Energy (26 March-4 April 1990) requested the Secretary-General to prepare a report on progress achieved in the mobilization of financial resources for the implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy, including consultative meetings, and inter-agency coordination in the field of new and renewable sources of energy. This report has been prepared in response to that request. 1/

I. MOBILIZATION OF FINANCIAL RESOURCES

2. The mobilization of financial resources is of critical importance for the implementation of the Nairobi Programme of Action, 2/ which recognized that each country would, in the process of developing its new and renewable sources of energy, require fuller mobilization of domestic financial resources. In addition, more expanded international financing would be needed, both public and private. Public financial resources would be channelled largely through bilateral and multilateral cooperation, including entities within the United Nations system.

3. Consultative meetings were identified in the Programme as a mechanism for generating additional financial resources. 3/ During the first half of the 1980s such meetings were convened at the national, regional and global levels, but with disappointing results. During its fifth session, the Committee expressed concern that no major progress had been made in mobilizing financial resources and that, in particular, no consultative meetings had been organized since 1986. Consequently the Committee requested the Secretary-General to undertake the necessary arrangements for convening consultative meetings. The Committee also recommended that adequate preparations precede the meetings, in order to ensure their successful outcome.

4. The Committee also called for the mobilization of additional resources through the existing financial mechanisms and organizations within the United Nations system and for the strengthening of the United Nations Trust Fund for New and Renewable Sources of Energy and of the UNDP Energy Account.

A. Trends in resource mobilization

5. As shown in table 1, total public budgets for research, development and demonstration in new and renewable sources of energy in International Energy Agency (IEA) countries declined sharply, from $1,665 million in 1980 to $487 million in 1990, a fall of about 70 per cent. Moreover, the share of research, development and demonstration expenditures in new and renewable sources of energy declined even further, compared to other energy sources, from 14 per cent to only 8 per cent.

Table 1. Total budgets of IEA countries in research, development and demonstration in the energy sector

(Millions of 1990 United States dollars, unless otherwise specified)

	1980	1990	1990 as percentage of 1980	Percentage of total 1980	Percentage of total 1990
Energy conservation	862.8	388.9	45.1	7.4	6.5
Coal	1 707.6	1 147.1	67.2	14.7	19.3
Oil and gas	477.8	183.3	38.4	4.1	3.1
Nuclear energy	6 981.9	3 745.3	54.3	59.4	62.9
Conventional	(3 499.6)	(2 264.1)	(64.7)	(30.2)	(38.0)
Breeder	(2 369.3)	(654.2)	(27.5)	(20.5)	(11.0)
Fusion	(1 013.0)	(827.0)	(81.6)	(8.7)	(13.9)
New and renewable sources of energy	1 665.4	486.5	29.2	14.4	8.2
Solar heating	(226.5)	(36.6)	(16.2)	(2.0)	(0.6)
Solar thermal	(348.7)	(19.1)	(5.5)	(3.0)	(0.3)
Solar photovoltaic	(330.9)	(177.3)	(53.6)	(2.9)	(3.0)
Wind energy	(264.4)	(85.5)	(52.1)	(1.4)	(1.4)
Ocean energy	(103.7)	(9.1)	(8.8)	(0.9)	(0.2)
Biomass	(136.8)	(66.3)	(48.5)	(1.2)	(1.1)
Geothermal	(354.3)	(69.8)	(19.7)	(3.1)	(1.2)
Total	11 605.5	5 951.1	51.3	100.0	100.0

Source: "Assessment and review of the implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy" (A/AC.218/SG.1/L.2), chap. IV.

6. Similar sharp declines have taken place in developing countries, partly due to the keen competition from conventional sources of energy and partly due to severe shortages of capital, from both internal and external sources. In the light of changing trends in international energy markets during the past several years, programmes and projects on new and renewable sources of energy lost their earlier priority even in areas where they were considered, at the time, economically and technically feasible. The declines differed by individual country and also by type of activity. In general, despite the considerable efforts made, the financial resources allocated to programmes in new and renewable sources of energy during the past decade have been limited. Consequently, new and renewable sources of energy could not have a significant impact on the economies of developing countries, either at the national or local level.

7. The financing of programmes and projects in new and renewable sources of energy in developing countries has been carried out through domestic and external funding. In domestic funding, the government budget allocations have played the most important role, either directly or through banking and other credit systems; the participation of the private sector appears to have been rather limited. External financing has come from both bilateral and multilateral sources, and among the latter, intergovernmental organizations (e.g., the European Community) and the United Nations system, especially the World Bank Group and regional development banks, have provided the bulk of it. In bilateral financing, the bulk has come through official development assistance (ODA) and from private sources.

8. Table 2, covering the period 1980-1992, provides a general view of funding sources and their financing of new and renewable sources of energy projects in developing countries. Of the reported $31.6 billion, about 36 per cent came from domestic resources, and the balance of 64 per cent from external sources. Of the latter, multilateral sources accounted for about 27 per cent, bilateral sources for nearly 19 per cent. Hydropower accounted for about 56 per cent of the expenditures, followed by biomass (27 per cent), energy conservation (3.7 per cent), geothermal energy, energy planning, solar and wind energies, and others.

9. While it is generally known that financial transfer through bilateral programmes, especially from developed market economies, is significant, the relevant data available to the Secretariat are unfortunately incomplete. Communications with the relevant authorities have not resulted in adequate, additional information for presentation to the Committee. It is to be hoped that comprehensive information will be provided by the countries concerned so that the Committee, during its sixth session, may consider the matter more meaningfully.

10. Financial expenditures by the United Nations system are shown in table 3, which includes projects in new and renewable sources of energy, energy conservation and energy planning. For the period 1982-1992 projects executed by the United Nations system in developing countries amounted to $13.2 billion. Of that amount, large-scale hydro accounted for $8.6 billion,

Table 2. Funding on new and renewable sources of energy in developing countries, by the type of organization, 1982-1992 a/

(Thousands of dollars)

Area of activity	Domestic	Inter-governmental	Non-governmental	Bilateral	United Nations system	Total
Hydro b/	3 716 601.6	4 095 370.0	844 943.2	4 061 958.1	5 052 917.1	17 771 790.0
Geothermal	389 975.2	154 065.2	35.0	351 754.7	179 528.3	1 075 358.4
Solar c/	185 539.8	24 354.0	282.2	254 118.7	330 554.8	794 849.5
Wind	25 781.1	7 768.9	19.5	54 385.9	21 421.8	109 377.2
Biomass d/	6 819 488.0	224 854.8	1 088.5	656 051.2	1 000 173.7	8 701 656.2
Planning	64 080.3	200 414.7	1 752.8	208 735.0	501 914.5	976 897.3
Conservation	91 722.8	12 592.0	0.0	104 307.2	962 976.9	1 171 598.9
Other	77 360.5	205 254.9	11 531.8	372 122.8	638 362.7	3 304 632.7
Total	11 370 549.3	4 924 674.5	859 653.0	6 063 433.6	8 390 349.8	31 608 660.2

Source: United Nations Secretariat, Department of International Economic and Social Affairs, New and Renewable Sources of Energy Section.

(a) Figures for 1991 and 1992 are provisional; they are incomplete and refer to commitments only.

(b) Large and small scale.

(c) Solar thermal and photovoltaic.

(d) Alcohol, biomass, biogas, fuelwood and charcoal.

Table 3. Financial expenditures for activities executed by the United Nations system, by area of activity, 1982-1991

(Thousands of dollars)

Organization	Alcohol	Biomass	Biomass	Charcoal	Conventional hydro	Conservation	Fuelwood	General	Geothermal	Mini hydro	Oil-shale	Peat	Planning	Solar	Tar sands	Voltaic	Wind	Other	Total	Percentage
CTC	--	--	--	--	--	--	--	6.0	--	--	--	--	--	--	--	--	--	--	6.0	--
DIEC	--	--	--	--	--	--	--	2 273.6	--	--	--	--	--	--	--	--	--	--	2 273.6	.02
DIESA	--	--	--	--	--	185.6	--	1 657.6	--	--	--	--	1 380.9	--	--	220.5	--	--	5 653.6	.04
DTCD	--	1 249.0	102.1	--	5 588.9	7 498.9	256.2	5 947.8	53 902 6	24 710.2	1 30.0	67.2	21 387.1	5 133.1	--	5 514.8	1 596.1	216.1	135 273.6	1.01
ECA	66.1	--	146.1	--	81.0	147.1	147.1	150.1	6.6	161.0	75.6	133.5	663.0	665.6	--	51.4	75.6	--	2 548.0	.02
ECE	--	--	--	--	--	655.0	--	--	--	--	--	--	--	475.0	--	--	--	--	990.0	.01
ECLAC	--	--	10.6	--	18.5	280.6	71.7	801.1	18.5	--	--	--	1 350.1	143.0	--	--	148.0	--	2 862.5	.02
ESCAP	166.5	602.5	1 285.5	131.2	26.7	1 146.6	976.1	14 861.0	91.2	1 767.0	--	60.0	9 449.6	940.5	--	2 961.9	857.6	--	34 215.7	.26
ESCWA	--	210.0	442.4	--	71.0	906.0	--	986.0	--	90.6	--	--	907.4	179.1	--	202.4	174.8	--	4 522.5	.03
FAO	250.0	2 187.4	2 565.9	7 169.5	155.2	3 569.6	165 182.9	6 329.6	65.0	170.0	--	--	5 075.3	1 409.6	--	--	930.7	7 109.6	196 014.5	1.49
IAEA	--	--	--	--	--	--	--	--	--	--	--	--	--	286.0	--	--	--	--	286.0	--
IBRD	--	42 796.1	3 669.8	21 131.1	7 757 665.1	881 040.4	466 651.1	874 699.1	110 671.3	22 648.8	20 000.0	--	480 000.1	2 950.4	--	--	2 701.1	--	10 606 425.0	80.40
IDA	17 650.2	--	18 126.0	50 771.4	822 070.9	111 522.5	618 596.5	191 180.2	14 792.6	--	--	--	91 697.5	--	--	--	--	1 084.0	2 031 175.8	15.40
IFAD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ILO	--	29.8	28.3	1 786.8	1.1	1 459.2	3 770.4	3 056.4	8.1	648.1	--	--	3 743.1	48.5	--	--	21.5	71.5	12 685.7	.10
IMETHAM	--	7.4	7.4	--	--	11.0	11.0	--	7.4	--	--	--	--	7.4	--	7.4	7.4	--	110.4	--
IMO	--	--	--	--	--	--	--	--	--	--	--	--	--	26.7	--	--	--	--	26.7	--
IMTA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
INFRA	--	53.5	133.1	--	--	135.0	--	767.6	--	--	--	--	430.0	100.8	--	--	133.1	--	1 953.5	.01
INCSTD	--	--	--	--	--	--	--	195.1	--	--	--	--	--	--	--	1 000.0	--	--	1 195.1	.01
INSTRAD	--	--	55.0	--	55	--	--	235.0	--	55.0	--	--	121.1	--	--	--	--	--	521.1	--
UNDP	--	7 048.6	1 056.4	669.4	5 109.5	2 635.5	10 052.5	1 907.7	864.1	6 785.9	648.1	2 048.8	1 926.2	827.7	478.1	145.2	8 138.7	61.1	54 182.6	.41
UNEP	--	11.0	458.4	13.4	--	96.9	197.1	288.1	--	26.0	--	--	163.1	114.7	--	235.2	108.5	--	2 118.8	.02
UNESCO	--	540.8	2 108.4	0.0	29.8	145.7	826.7	10 656.3	571.6	21.7	--	--	150.9	1 581.4	--	--	33.3	--	19 066.5	.14
UNICEF	--	401.8	82.5	--	--	--	186.8	185.5	--	98.0	--	--	--	297.5	--	--	153.4	--	1 957.5	.01
UNIDO	3 721.8	2 194.9	11 152.6	966.8	1 161.9	9 915.9	674.6	5 726.6	--	4 292.5	--	444.6	5 878.7	5 919.8	--	3 699.3	1 321.7	21.1	57 063.7	.43
UNITAR	--	--	--	--	--	--	--	845.1	716.7	--	--	--	--	24.0	143.2	740.7	--	--	2 473.7	.02
UNU	--	151.2	110.0	--	--	--	--	449.2	1 273.2	--	--	--	1 370.6	110.0	--	110.0	110.0	--	3 684.0	.03
UNV	--	--	--	--	--	--	--	65.1	--	--	--	--	--	--	--	--	--	--	65.1	--
UPU	--	--	--	--	--	10.1	--	--	--	--	--	--	--	--	--	--	--	--	10.1	--
WHO	--	--	10.0	--	--	--	--	51.5	--	--	--	--	--	--	--	--	--	--	13.5	--
WIPO	--	--	--	--	--	--	--	58.0	48.9	--	--	--	--	48.9	--	--	48.9	--	105.1	--
WMO	--	--	--	--	803.4	--	--	858.2	--	42.9	--	--	388.9	1 168.7	--	101.8	855.8	--	3 612.7	.03
Total	34 852.6	57 646.2	62 028.9	82 865.8	9 592 808.2	1 021 643.6	1 287 635.1	1 127 565.1	232 578.0	61 472.1	20 853.4	2 743.1	547 176.9	26 655.4	625.1	14 990.6	22 024.4	8 568.8	13 184 113.8	
Percentage	0.26	0.44	0.47	0.63	65.13	7.74	9.76	8.55	1.69	0.47	0.16	0.02	4.15	0.19	--	0.11	0.17	0.06		
Percentage without large-scale hydro	0.76	1.26	1.35	1.80		22.25	28.04	24.56	5.05	1.34	0.45	0.06	11.92	0.58	0.01	0.33	0.48	0.19		

Source: United Nations Secretariat, Department of International Economic and Social Affairs, New and Renewable Sources of Energy Section.

Note: For a list of abbreviations, see the annex.

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or 65.13 per cent. Commitments for the remaining sources were thus only $4.59 billion. Figure I illustrates percentage distribution by energy sources, excluding large-scale hydro. Fuelwood received the largest commitments (28 per cent), followed, in descending order, by general energy sources (25 per cent), energy conservation (22 per cent) and energy planning (12 per cent).

11. The bulk of the funding by financial mechanisms and institutions within the United Nations system has been for capital investment for large-scale hydro power development. As shown in table 4, during the period 1982-1992, a total of about $8.3 billion was channelled through the United Nations system. The largest share went through the World Bank, which together with IDA, accounted for $7.88 billion, largely for capital investment activities - $6.02 through IBRD and $1.86 through IDA. The bulk of the World Bank funding was for conventional hydro ($4.1 billion), followed, in descending order, by conservation ($740 million), general new and renewable sources of energy ($456 million), and energy planning ($360 million). Conventional hydro also accounted for the bulk of the IDA funding ($877 million) followed by fuelwood ($471 million) and conservation ($198 million).

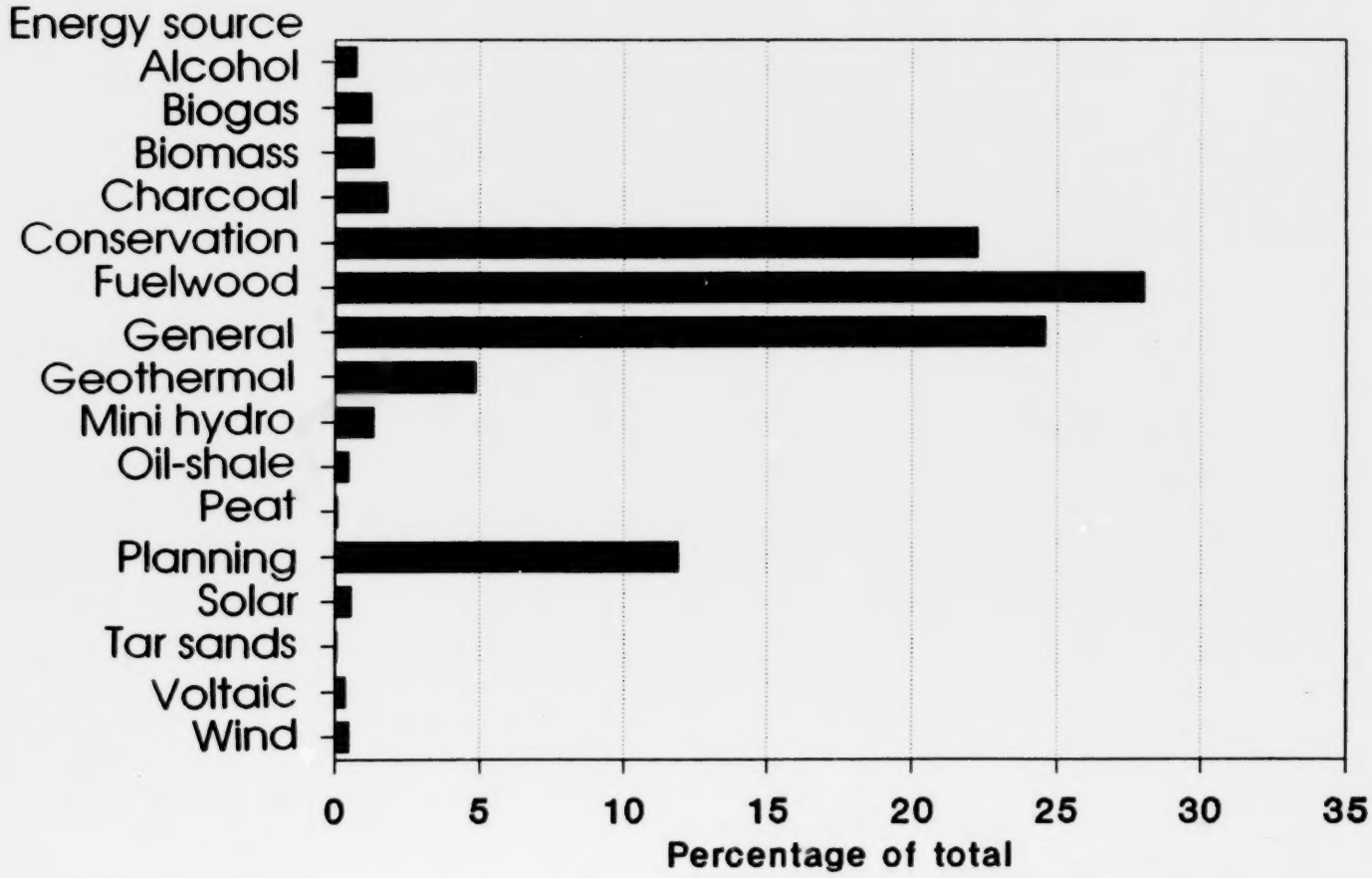
12. The funding of the United Nations Development Programme (UNDP) was significant for the same period: $188.2 million, of which the largest share was for geothermal energy development ($43 million), followed, in descending order, by energy planning ($27.7 million), fuelwood ($26.7 million), and conventional hydro ($16.5 million). A number of funds managed by UNDP also contributed to activities in the field of new and renewable sources of energy. They included United Nations Sudano-Sahelian Office (UNSO), the United Nations Capital Development Fund (UNCDF), the United Nations Special Development Industrial Services Programme, the United Nations Fund for Science and Technology for Development (UNFSTD), the United Nations Development Fund for Women (UNIFEM) and the Energy Account of UNDP.

13. The United Nations Trust Fund for the Development and Utilization of New and Renewable Sources of Energy, which was established in 1982 within the Office of the Director-General for Development and International Economic Cooperation, has received a total of approximately $2.5 million. A variety of activities related to new and renewable sources of energy were funded through the Fund during the 1980s, including global and regional consultative meetings.

14. The UNDP Energy Account was an important channel of mobilizing additional resources for new and renewable sources of energy projects in developing countries. During 1981-1990, its resources amounted to $40.4 million, from trust fund arrangements and voluntary contributions. Since 1988, voluntary contributions to the Account have ceased, and trust fund arrangements have declined substantially.

15. Another mechanism envisaged by the Committee for mobilizing additional financial resources for the implementation of new and renewable sources of energy projects was consultative meetings. They were conceived as a flexible way to bring together potential donors, recipients and interested

Figure I. Financial expenditures for activities executed by the United Nations system, 1982-1992



Source: United Nations Secretariat, Department of International Economic and Social Affairs, New and Renewable Sources of Energy Section.

Table 4. Major funding sources for projects in new and renewable sources of energy in the United Nations system, 1982-1992

(Thousands of United States dollars)

	FAO	IBRD	IDA	UNDP	UNCDF	UNDPE	SIS	SMFLDC	FSTD	UNIFEM	UNRO	FIT	UNIDO	IDF	TOTAL
Alcohol	54.0	27.0	34 200.1	1 592.4	--	--	19.5	--	--	--	--	19.1	143.3	279.4	36 334.8
Animal	1 163.3	202.0	480.0	4 057.4	--	--	--	--	--	--	50.0	146.8	--	--	6 099.5
Biogas	810.2	19 906.7	--	4 206.5	--	52.9	72.9	--	407.4	--	--	500	347.2	1 434.4	27 738.2
Biomass	1 434.9	3 163.2	23 786.7	5 645.4	--	861.0	224.4	--	5 338.8	--	434.9	640	1 437.4	767.1	43 733.8
Charcoal	3 338.2	10 994.0	33 489.8	1 509.4	--	--	169.0	--	150.0	--	33.0	1 020.6	460.4	23.5	51 187.9
Conventional hydro	118.6	4 109 419.6	877 011.8	16 532.5	3 057.8	585.0	--	--	535.4	--	929.6	15	26.0	--	5 008 231.3
Conservation	2 285.2	739 923.3	198 203.0	14 010.1	--	803.2	36.0	--	295.0	22.7	1 983.9	900.4	1 283.8	356.5	960 103.1
Fuelwood	83 660.0	205 878.6	471 118.7	26 694.9	615.1	403.0	248.1	45.5	791.0	209.7	20 365.4	22 961.3	76.8	--	833 068.1
General	3 949.2	456 212.6	93 575.3	13 358.7	57.3	394.4	23.4	--	7 358.2	--	367.6	1 413.9	1 212.7	220.8	578 144.1
Geothermal	40.0	81 440.4	47 149.8	43 223.7	--	1 063.8	--	--	2 968.6	--	--	25	--	--	175 911.3
Mini hydro	132.4	10 812.6	--	7 376.2	21 110.1	590.3	187.0	--	--	--	13.3	215.7	979.7	848.7	42 266
Oil-shale	--	20 000.0	--	372.7	--	57.4	--	--	--	--	--	0	--	--	20 430.1
Peat	--	72.2	--	1 016.0	--	--	--	--	--	--	1 248.2	67.2	--	444.6	2 848.2
Planning	2 406.4	359 715.4	77 807.5	27 684.5	615.1	13 756.6	75.8	--	3 696.5	--	--	2 408.7	2 257.1	162.4	490 546
Solar	728.0	2 169.0	35.0	7 443.4	--	247.5	312.7	--	1 345.0	48.0	14.0	650	2 315.7	1 355.7	16 664
Voltaic	--	--	--	8 736.1	58.2	103.5	38.0	--	1 334.6	--	--	0	28.0	--	10 290.4
Wind	708.2	2 949.0	35.0	4 700.0	--	472.3	97.2	--	764.6	--	7 652.0	138.7	1 400.1	180.3	19 097.4
Others a/	--	--	--	216.3	--	183.5	21.4	--	--	--	37.2	--	--	--	458.4
Total	100 828.6	6 022 885.6	1 856 892.7	188 159.9	25 513.6	19 390.9	1 456.0	45.5	24 985.1	280.4	33 091.9	31 122.4	11 968.2	6 073.4	8 322 694.2

Source: United Nations Secretariat, Department of International Economic and Social Affairs, New and Renewable Sources of Energy Section.

Note: For a list of abbreviations, see the annex.

a/ Tar sands, tidal, vegetable oils, wave.

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organizations within and outside the United Nations system. In the past, a number of meetings were held at national, subregional, regional and global levels. But in recent years, in view of declining interest, no such meetings have been organized. However, their effectiveness has not been conclusively ascertained. Since the conclusion of the fourth session of the Committee, no consultative meeting has been convened.

B. Conclusions

16. Despite successes in the early 1980s, the financing of new and renewable sources of energy programmes and projects has declined considerably in recent years. In the developed market economies, public expenditures for research, development and demonstration activities have been scaled down, and private involvement and investments have been greatly curtailed. In the developing world, with few exceptions, similar trends have been aggravated by the deterioration of economic conditions, especially in Africa and Latin America and the reduced availability of funding from bilateral and multilateral sources.

17. Changes in perception with regard to the global energy situation and its prospects, including the environmental effects of expected development and use of conventional sources of energy, have most recently led to a revival of interest in an energy transition, as recommended in the Nairobi Programme of Action. Undertaking remedial action to allay these concerns will require massive efforts for the mobilization of additional and adequate financial resources for programmes and projects in new and renewable sources of energy, particularly in developing countries.

18. Such a mobilization will require a fundamental reordering of priorities by Governments in both developed and developing countries with regard to their national policies, the augmentation of financial flows through bilateral and multilateral channels, and a much greater involvement through new incentives of the private sector, including direct foreign investment in the developing world.

II. INTER-AGENCY COORDINATION

19. The importance of coordinating activities in new and renewable sources of energy within the United Nations system has been underscored by the Committee at its past five sessions. To help the Committee in this task, an Inter-Agency Group on New and Renewable Sources of Energy was established in February 1983, under the auspices of the Advisory Committee on Coordination (ACC), following a decision by the General Assembly (resolution 37/250). Following the recommendations of the Nairobi Programme of Action, the Director-General for Development and International Cooperation was entrusted with the task of coordinating the contributions of the organs and organizations of the United Nations system in the implementation of the Nairobi Programme of Action.

20. At its first session the Committee decided that the Unit on New and Renewable Sources of Energy in the Department of International Economic and Social Affairs would be entrusted, inter alia, with the task of serving as a focal point for information on multilateral, bilateral and other activities in the area of new and renewable sources of energy. At subsequent sessions, the Committee reiterated the importance of coordination and cooperation. At its second session in 1984, the Committee urged that, further efforts should be made with a view to ensuring rational, effective and efficient coordination among entities with the United Nations system involved in the development and utilization of new and renewable sources of energy. 4/ At its third session, the Committee endorsed the importance of increasing inter-agency coordination within the United Nations system in order to enhance its effectiveness and increase the responsiveness in the implementation of the Nairobi Programme of Action. 5/ At its fourth session, the Committee re-emphasized the importance of effective coordination within the United Nations system and called upon the Inter-Agency Group to intensify its efforts for enhanced coordination. 6/

Activities of the Inter-Agency Group on New and Renewable Sources of Energy

21. Since its establishment, the Inter-Agency Group on New and Renewable Sources of Energy has met once a year. It has held 10 sessions so far, with the participation of interested organizations of the United Nations system. During the fifth session of the Committee, the Group held its ninth meeting, during which it was decided, inter alia, that in order to further enhance coordination and cooperation within the United Nations system, a few areas should be selected and joint reports presented at subsequent sessions of the Group. The following areas were identified and respective entities selected to play leading roles:

(a) Energy policies for rural development (FAO);

(b) Strategies for commercialization of new and renewable sources of energy (UNDP);

(c) Energy and the environment (UNEP);

(d) Role of women in new and renewable sources of energy (INSTRAW).

The selected entities would collaborate and cooperate with other members of the Inter-Agency Group.

22. During its tenth session, in March 1991, the Group was briefed on the deliberations of the Committee at its fifth session and considered actions to be taken in preparation of the sixth session of the Committee. Individual members of the Group made presentations on current and planned activities by their respective entities at the national, regional and/or global levels, covering a wide range of activities as part of coordination and cooperation efforts. The presentation was followed by a discussion; some of the conclusions were as follows:

(a) There was an apparent reduction in the number of requests by Governments for small solar drying projects; large-scale solar drying projects were, however, still popular. Experience with large-scale solar thermal systems for electricity generation, while apparently successful in specific areas in the developed countries (notably California, USA) might not be easily replicable in the developing countries or, for that matter, in other developed countries. Novel approaches such as energy cooling in developing countries, which had received a great deal of interest, deserved encouragement;

(b) There was an increase in the number of requests for biomass projects, including biogas. However, the experience with biogas projects was varied: some were successful, while others had run into some problems;

(c) Strong interest had been expressed by many countries in programmes associated with the promotion, development and distribution of efficient wood stoves;

(d) Photovoltaic projects were promising, and the potential for their application had increased, especially in remote areas. Cooperation between entities at the regional level in photovoltaic systems was a welcome development; further cooperation was called for. Increasing experience had been gained in projects on small-scale hydro systems;

(e) Large-scale wind energy systems had proved competitive for electricity generation. Experiences with these systems were available in both developing and developed countries.

23. Another important focus of the Group was the emerging consensus on the role of new and renewable sources of energy in achieving sustainable development with reduced adverse environmental impacts. The Group agreed that the focus should receive increasing attention by the United Nations system, as should the promotion of rapid transfer of the relevant technologies to developing countries.

24. The spirit of cooperation and collaboration was, during the tenth session of the Group, exemplified by consideration of a draft report by FAO entitled "Energy policy for rural development: a review of inter-agency cooperation", focusing on the activities of five entities - the Department of Technical Cooperation for Development of the United Nations Secretariat, FAO, UNEP, UNESCO and the World Bank. The Group commended the report as the important beginning of a series of similar exercises highlighting areas of concrete cooperation and coordination, and concluded that there was need for a common approach and methodology, for evaluating such projects.

25. At a later date UNDP circulated a report entitled "Strategy for disseminating/commercializing proven renewable energy technologies" to the members of the Group. The report underlines the lack of follow-up to the numerous projects financed by multilateral/bilateral organizations for demonstrating the technical and financial viability technologies in new and renewable sources of energy over the years. The document, which focuses on

photovoltaic technologies, examines financial and institutional barriers to commercialization, concentrating on policy and markets.

26. The Group concluded that there was need for a United Nations system-wide mechanism that could articulate policies on important energy matters, in which the Group could play an important role in evaluating, discussing, analysing and articulating related topics - for example, energy planning, energy conservation and efficiency - including environment and economic development.

Notes

1/ See Official Records of the General Assembly, Forty-fifth Session, Supplement No. 36 (A/45/36), annex, resolution 2.

2/ Report of the United Nations Conference on New and Renewable Sources of Energy (United Nations publication, Sales No. E.81.I.24), chap. I, para. 72.

3/ Ibid., para. 91.

4/ Official Records of the General Assembly, Thirty-ninth Session, Supplement No. 44 (A/39/44).

5 Ibid., Supplement No. 44 (A/41/44), resolution 2 (III).

6/ Ibid., Supplement No. 36 (A/43/36), para. 72.

Annex

LIST OF ABBREVIATIONS

FAO	Food and Agriculture Organization of the United Nations
IBRD	International Bank of Reconstruction and Development (World Bank)
IDA	International Development Assistance
UNDP	United Nations Development Programme
UNCDF	United Nations Capital Development Fund
UNDPE	Energy Account of UNDP
SIS	Special Industrial Services Programme (UNDP)
SMFLDC	Special Measures Fund for the Least Developed Countries (UNDP)
FSTD	United Nations Fund for Science and Technology for Development
UNIFEM	United Nations Development Fund for Women
UNSO	United Nations Sudano-Sahelian Office
FIT	Funds in trust for use by the United Nations
UNIDO	United Nations Industrial Development Organization
IDF	International Development Fund (UNDP)
UNCTC	United Nations Centre on Transnational Corporations
DIEC	Office of the Director-General for Development and International Economic Cooperation
DIESA	Department of International Economic and Social Affairs, United Nations Secretariat
DTCD	Department of Technical Cooperation for Develcpment, United Nations Secretariat
ECA	Economic Commission for Africa
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean

ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
IAEA	International Atomic Energy Agency
IFAD	International Fund for Agricultural Development
ILO	International Labour Organisation
INSTRAW	International Research and Training Institute for the Advancement of Women
ITU	International Telecommunication Union
PSCA	Department of Political and Security Council Affairs, United Nations Secretariat
UNHCS	United Nations Centre for Human Settlements (Habitat)
UNCSTD	Centre for Science and Technology for Development, United Nations Secretariat
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization

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